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ABSTRACT

This report describes in detail the development of courses in accounting and data processing offered to high school seniors for college credit. The appendix includes sample final exams in accounting and data processing. Cooperation among personnel from both the secondary and post-secondary levels is essential to the success of such a program. The project covers a two-year period with evaluation by students each year, and indicates that generally, students respond positively to the opportunity to experience college level work while still in high school. They perform as well in articulation courses as in either high school or post secondary courses (determined in follow-up). Expansion of articulation courses is a recommendation. Although this field articulation project is school specific (Queensborough Community College and three New York feeder high schools) the models and methods can be used as a basis for similar programs and evaluation elsewhere. (Author/DON)

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HIGH SCHOOL - COMMUNITY COLLEGE ARTICULATION FOLLOW-UP

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Institute for Research and Development in Occupational Education
Center for Advanced Study in Education
The Graduate School and University Center
of the City University of New York

in cooperation with the
Division Of Occupational Education Supervision
The New York State Education Department
University of the State of New York

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FOREWORD

The Institute for Research and Development in Occupational Education (IRDOE) has long been concerned with the problem of articulation between secondary schools and postsecondary educational institutions. Earlier, an IRDOE project dealing with the need to impress counselors with the importance of occupational information and planning was combined with career counseling delivery systems. Students who experience difficulties in making occupational education decisions, were served by a course developed by IRDOE entitled "The Psychology of Career Choice." A computer-assisted occupational information system project was undertaken by IRDOE for secondary and postsecondary students in order to facilitate the articulation between these institutions, and the articulation between the completion of education and entry into an appropriate career ladder stream.

In view of these activities it was gratifying to note the priorities established in Regents Position Paper Number 21 dealing with articulation of secondary/postsecondary occupational education. Furthermore, it was satisfying to participate in a project designed to minimize duplication of curricular offerings between secondary schools and community colleges, and to facilitate the education of students. As noted in this and prior documents, articulation activities are subject to a number of difficulties. In addition to the general problems in the development of curriculum materials, additional problems arise in arranging new relationships between high school and community college personnel, and trying to establish mechanisms whereby these relationships can continue to exist when project support is withdrawn. It is also heartening to note, therefore, that in this articulation project there is ample evidence that the articulation practice initiated in previous phases of this endeavor have worked well. There is every evidence that these will continue to stay in place when the project is terminated.

Simultaneously, this report notes that less than maximal efficiency is to be expected in the initial implementation stage of some new courses. As a result of the experience gained from this project suggestions are made to cope with this problem.

Lee Cohen, Ph.D.
Director, IRDOE

ACKNOWLEDGMENTS

Any project such as the present one, which requires extensive contact with a variety of institutions, requires the goodwill and assistance of many individuals in order to accomplish its objectives. This project is certainly no exception, and has profited enormously from the help given by a variety of individuals at a professional and support level who have provided assistance to this project in a variety of different ways. At Queensborough Community College gratitude is expressed to Dean Irving Slade and his colleagues for the assistance rendered in establishing contact with other arms of the college and in following up students. Professor Sheldon Somerstein, Chairman of the Department of Business at Queensborough Community College, assisted the project immeasurably by support in all phases of the work. Gratitude is expressed both to him and members of his department for help with the development of the curricula, development and administration of the achievement tests, and advice and support in various phases of this project.

Mr. Norman Watnick, Assistant Director of Business and Distributive Education, Center for Career and Occupational Education, of the New York City Board of Education has been extremely supportive of the concept of articulation in general, and, in addition, of great assistance in all phases of the conduct of this project. Without his help the establishment of the linking mechanisms between the secondary schools, and the community colleges would have been well nigh impossible.

Finally, Howard Everson was a research assistant on this project. His contribution to all phases of this work have been far greater than expected of a research assistant. In addition to this acknowledgment, he amply deserved the coauthor credit he received. Mara Zibrin also provided valuable assistance with various phases of this project.

Sigmund Tobias
Project Director

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INTRODUCTION

This project was originally initiated in response to the New York State Regent's Position Paper #21 [1] as well as other recent articulation projects.[2] These documents describe the need for cooperative articulation efforts between postsecondary schools and their feeder institutions, and also detailed the readiness of these institutions to engage in such efforts. The first phase of this project was described in an earlier report[3] summarizing the accomplishments of that project.

The present report will detail the activities undertaken by the staff as a follow up to the initial efforts. In general, these activities fall into the following categories: 1) Review of the literature of articulatory effort in general. 2) Follow up of students participating in the initial phase of this project. 3) Evaluation of students participating in project's second phase. 4) Continuation of contact with participating community college and high school personnel. And, finally, 5) Continued exploration with education personnel regarding potentials for future development.

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[1] New York State Education Department 1974.

[2] Research Report No. 73-2 IRDOE-CUNY.

[3] Research Report No. 45-76 IRDOE-CUNY.

REVIEW OF THE LITERATURE

There is a growing body of literature in the articulation area. Generally, these references and technical reports consists of descriptions of articulation projects, recommendations regarding the desirability of articulation efforts, and descriptions of problems encountered in implementing articulation projects. While each of these publications makes its contributions to the body of knowledge and experience dealing with articulation efforts, little could be gained from an exhaustive review of all the literature by virtue of the substantial amount of duplication in much of it. The present strategy will, therefore, be to provide a summary of a random sample of available articulation references in order to convey some sense of what is being recommended in this body of literature.

The fact that articulation is a source of present concern in the educational community is reemphasized by an article appearing recently in the New York Times.[4] The newly appointed U.S. Commissioner of Education, Dr. Ernest L. Boyer, issued a call for more diversity and flexibility in American schools and colleges. As an example, Dr. Boyer suggested the development of programs that introduce college-level courses to talented high school students. Clearly, Dr. Boyer's statements underscore the need to develop and implement secondary school/college articulation projects.

Faced with the prospects of declining enrollments, shrinking budgets, and increased demands for more accountability, educators across the country are searching for ways to reduce waste and avoid costly duplication of effort. Many high schools and colleges are now re-thinking their curricular practices (Holloway, 1974; Romine, 1975; Singer, 1974). Articulation, then, is perceived as useful because its aim is to structure programs and engage in practices that link secondary and postsecondary curricula (Holloway, 1974). As a further indication of the perceived efficacy of articulation, broad based statewide efforts to make these practices more systematic and more centrally coordinated are currently underway in Florida, Oregon, and California (Holloway, 1974).

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[4]Fiske, E. Carter's education chief urges "more variety" in U.S. schools. New York Times, 6/20/77, p. 32.

Although the bulk of the current articulation activities are of relatively recent origin the evidence suggesting a need for articulation has been available for almost 50 years (Osburn, 1928). The Progressive Education Assoication, back in 1930, saw the need for curriculum modification in high schools and colleges and encouraged the development of articulation projects (Aiken, 1942). And in 1951, after much study, articulation programs were begun at Harvard, Princeton, and Yale (Harvard, 1953).

More contemporary studies, by Blanchard (1971) and Holloway (1974), provide even further documentation of overlap and duplication in high school and college curricula, particularly in the eleventh and twelfth grades and in the first two years of college. According to these researchers, nearly one-third of the subject matter of the first two years of college is a repetition of what has been taught in high school.

Aside from the demands to eliminate duplication and increase efficiency, societal imperatives, too, are making the need for articulation efforts all the more compelling (Romine, 1975). The growing heterogeneity of college students, for instance, and their voiced dissatisfaction with dull and repetitious courses, point directly to the need for change. The knowledge explosion and the accompanying demands for more and better modes of learning are also making an impact on curricular development. Further, out of school learning experiences, the expanding community college movement, and the preparation for future educational opportunities have combined forces to press for necessary changes.

As more programs and services are offered, however, and as more groups of individuals are served by a single institution, articulation efforts become more and more complex (Midjaas, 1974). Accordingly, the "who," "what," "when," and "how" of articulation varies by type of program and by the group served. Wilbur (1975), though, outlines four general models of school/college articulation practices currently in use. Wilbur's outline is depicted in Table 1.

TABLE 1

Schema for Four General Articulation Models
After Wilbur (1975)

Teaching Responsibility	Course Design	
	Regular Catalog	Special Design
College Faculty	A	B
High School Faculty	C	D

Design A - includes programs whose design involves regular college faculty teaching catalog courses to non-matriculating high school students. This design allows students to interact with college professors, experience college-level course requirements, and earn credit for both high school and college.

Design B - involves college faculty working in conjunction with high school representatives designing special programs of study for advanced high school students. The college faculty is responsible for instruction.

Design C - this approach assumes the high school teacher can present college-level learning experiences. Specially selected high school faculty are trained by the college and then offer the program to their students. Usually, these courses carry credit which is applicable toward high school graduation requirements and which is transferable to post-secondary institutions for credit or advanced standing.

Design D - emphasis in this design is on the special nature of the course content and the use of norm referenced scores or ratings for which college credit is granted.

Articulation programs, like other educational programs and products, are often developed in response to a local need. It is not surprising then, to discover little or no systematic comparison at the national level of the various articulation models contained in the literature (Holloway, 1974). The professional literature in this case, despite its lack of empirical data, is useful to those

involved in the design and planning of activities in this area. Warnings of the dangers and difficulties inherent in articulation projects are well documented.

Institutional autonomy, faculty jealousy and mistrust, lack of administrative support, and varying credit policies are among the problems encountered when articulation is attempted (Holloway, 1974; Romine, 1975; Singer, 1974). School/college relations appear to be at the core of the problem. Singer (1974) warns educators working in this field to remain cognizant of three key factors of school/college relations:

(1) The college's philosphy on admission.

(2) The willingness of both sides to try to understand the other institution's problems and point of view.

(3) The nature of the procedures and techniques used in transferring information about individual applicants from high school to college.

In addition to the warnings found in the literature, some useful recommendations have also been made by practitioners familiar with the ways of articulation. Whenever institutions are thrown into competition with each other for funds, as is the case under the block grants of revenue sharing (Carnegie Commission, 1973), tensions and rivalries are bound to occur. In an effort to reduce the tensions and increase the flow of information related to articulation activities, a number of recommendations have been submitted (Blanchard, 1971; Carnegie Commission, 1973; Holloway, 1974; Romine, 1975; Singer, 1974). Specifically, these recommendations call for:

(1) Statewide funding of joint school/college projects, e.g. curriculum studies, experimentation with the middle college approach, conferences.

(2) The creation of statewide guidelines for articulation practices.

(3) The development of informal, voluntary liaison between the staffs of the State Boards of Education and Higher Education.

(4) More flexible admissions requirements at the college level.

(5) Greater inter-institutional coordination within and across educational levels, while at the same time protecting institutional autonomy, e.g. the establishment of a school relations office to enable

closer contact with individual schools.

(6) Provide the opportunity for college and secondary school personnel to attend seminars, workshops, and to participate in inter-school visits in order to plan, develop, and interpret curricular offerings.

(7) The promotion of faculty exchanges between school and colleges which would include clinical professorships and joint appointments.

(8) The development of more ways for the student to demonstrate achievement, e.g. credit transfers, advance placement, etc.

(9) Prime consideration should be given to the learner rather than to the institution.

(10) The development of more precise goal definitions so as to accurately assess educational outcomes.

In addition to the recommendations and caveats outlined earlier, the literature suggests a need to study what it is that people enrolled in articulation programs want from them. What colleges accepting credit from these programs gain by doing so is a question also worth considering (Holloway, 1974). Consideration of the former, i.e. what the student wants from articulation, should be of particular value for planning consumer oriented educational alternatives.

BACKGROUND

The development of this field articulation project was an outgrowth of a variety of pressures suggesting that improved articulation in curricular and personnel practices between secondary schools and community colleges would be most advantageous. It was expected that such articulation would both ease the entry of high school students into community and senior colleges, and, potentially, avoid needless duplication and curricular practices. For a variety of reasons dealing with purely local factors this articulation project was implemented using Wilbur's Design C.

The senior year of high school was seen as a time when the implementation of articulatory efforts might well have a most significant impact. This choice was prompted by a number of considerations. One of these was the fact that making a greater variety of elective

offerings available at that stage would be most desirable for a variety of reasons. First, high school students typically finished their required courses in the senior year, and frequently have room in their program for elective offerings at this time. Second, in the senior year, students have generally narrowed down their range of educational and vocational objectives sufficiently so that they would choose elective courses closely tied to these future plans. Third, postsecondary school plans have generally been formulated by students in the senior year and, therefore, students would be more likely to enroll in elective courses which would have some probability of articulating with their postsecondary plans. Finally, in the student's senior year guidance counselors and other school personnel are establishing contact with postsecondary schools to which their students most frequently apply, allowing articulatory effort to profit from well established administrative contact between the two types of institutions.

As indicated in the previous report[5] Queensborough Community College was selected as the institution in which the demonstration articulatory effort would be implemented. Specifically, two courses in the Business Department at Queensborough were developed; accounting, and data processing dealing with the COBOL Language, the data processing language most frequently used in Business.

The choice of Queensborough and the business area were prompted by a number of considerations. At the community college level good relationships existed with the administration from prior projects and there was a good deal of eagerness on the administration's part to participate in such a venture. Choice of the business area in particular was prompted by a number of factors:

(1) The Business Department was a strong, large department.

(2) There were a large number of majors within this Department.

(3) Eagerness on the part of the administration of that Department to participate in experimental programs.

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[5]Research Report No. 45-76 IRDOE-CUNY.

(4) The presence of several business education programs offered at the high school level together with related offerings available at Queensborough Community College.

(5) The business education area in general was one which appeared to promise a continuing need for trained personnel despite general shrinkage in the economy. This continued need suggested that there would be an ample supply of students who could profit from such articulatory efforts in the future.

In the first phase of this project the administrative arrangements for the conduct of this work were established, and the curricula for that project developed and tried out at Queensborough Community College. The present document describes a two stage evaluation of this Articulation project: Phase I consisted of student participation in the project during 1975-1976 academic year, and Phase II of students in the 1976-1977 academic year.

DESCRIPTION OF PHASE I

This phase of the project was conducted during the 1975-1976 academic year. Queensborough Community College, a unit of CUNY, implemented an articulation program in Business Education that involved three of its feeder schools--Bayside, John Bowne, and Benjamin Cardozo High Schools. Specifically, the program was designed to make available to the students of these high schools articulation courses in the areas of accounting and data processing (COBOL). Two of the schools, Bayside, and Cardozo, offered articulation courses in accounting to their senior students, and John Bowne High School offered the data processing course. A complete list of the students participating in this phase may be found in Appendix A of this report.

During the year that this project was being implemented intensive meetings occurred between project personnel, faculty from Queensborough Community College, New York City Board of Education officials, and the affected high school chair people and faculty. Agreement had been reached on the curricula to be offered, and the time span. It was felt that since community college level work was

being offered, high school students might require more time than ordinarily allotted to that sequence in the community colleges. The courses were therefore, offered in the high school for a year, rather than the one semester allotted to the same contents in the community college. Student and faculty materials, such as course outlines, textbooks and the like were supplied to the high schools by project personnel.

Agreement had also been reached between the Queensborough Department of Business faculty, and the high school personnel that all the instruction, for the course would be conducted solely under the supervision of the high school faculty. It had also been agreed that a test, to be devised by the Queensborough faculty, would be administered near the end of the second semester of the course, and those students achieving an index of minimal mastery on these materials would be given advanced standing at Queensborough Community College. This agreement, the result of a large number of meetings, was mutually satisfactory to all involved.

Evaluation of the CUNY Shutdown

The time and energy devoted to the preparation of these procedures was, unfortunately, to prove fruitless during the first year of the implementation of this project. On the date set aside for the administration of the test of minimal competency by community college faculty the Chancelor of the City University of New York ordered all campuses of the University to close down due to the budgetary crisis. When the University was finally reopened two weeks later, it proved to be too late in the semester to arrange for an alternative examination date. Consequently, final achievement data for the students participating in this project during the first year in the form of minimal competency exams acceptable to the community college personnel were not available.

What was available, however, were names and identifying information of all the students participating in this project. These students were followed up in the subsequent year to assess what attitudinal, and other effects the project had.

Results of Telephone Follow Up

More than 40 high school seniors from the 3 feeder schools took part in the project. Twelve students completed the COBOL course at John Bowne. At Benjamin Cardozo High School 26 seniors completed the accounting course. And 4 students, all seniors, completed the articulation course in accounting offered by Bayside High School bringing the total number of students taking part in the articulation program to 42.

In an attempt at gaining some insight into the nature of the impact and effectiveness of this project, the students who participated in the initial stages were contacted by telephone and surveyed as to their views of the program. As mentioned earlier, 42 students completed the courses offered by the 3 feeder high schools. Telephone contact was established with 17 of these students, i.e. 40% of the students involved in the initial phase of the articulation project were surveyed. The survey instrument is attached in Appendix B. Unfortunately, the remaining 25 students could not be reached by telephone. (A variety of factors contributed to this lack of contact including inaccurate or unlisted phone numbers, students away at college, not living at home any longer, etc.)

Of the 17 students reached, nine had completed the accounting course at Benjamin Cardozo High School and the remaining 8 were from John Bowne High School where they had taken the data processing course. The following information, then, pertains solely to the 17 students contacted as part of the follow up survey. Tables 2 and 3 on the succeeding pages present a summary of the telephone survey results.

At the time of contact all 17 students were enrolled in post-secondary educational institutions. More than 85% of the students surveyed were enrolled in campuses of CUNY--12 at Queensborough Community College, 2 in Queens College, and 1 student attended Baruch College. As for the additional two students, one enrolled at Nassau Community College and the other is currently attending St. John's University.

All of the students questioned claimed that they were accepted by the colleges they indicated as their first choice. Moreover, the students unanimously asserted that the imposition of tuition at CUNY had little or no effect on their ultimate choice of college. Between the inception of this articulation project and its execution CUNY imposed tuition and it was feared that this would cause some of the students to alter their educational plans. According to the students surveyed the newly imposed tuition was not a significant factor in their choice of college.

Because of the turmoil and discontinuity resulting from the budget crisis occurring in New York City at the time and the subsequent two week shutdown of CUNY in June '76, the agreed upon instrument for testing the students' proficiency in these courses was not administered. Consequently, as indicated previously, an assessment of the students' abilities in the areas studied was never administered and neither advanced standing nor college credit was awarded to any of the students by Queensborough Community College.

TABLE 2

Summary of Telephone Survey Data: Accounting Curriculum
Cardozo High School

Number of Students in Articulation Course:	26
Number of Students Contacted :	9
Response Rate :	34.6%
Number of Students Enrolled in Post-secondary Educational Programs	
College :	14
No Data :	12
Number of College Credits Completed During First Term of College	
Number of Students :	12
Mean = 12.4, SD = 2.94, Range = 6-7	
Major Area of Concentration in College	
Business :	12
Other :	1

TABLE 3

Summary of Telephone Survey Data: Data Processing Curriculum
John Bowne High School

Number of Students in Articulation Course	:	12
Number of Students Contacted	:	8
Response Rate	:	66%
Number of Students Enrolled in Post-secondary Educational Programs		
College	:	8
No Data	:	4
Number of College Credits Completed During First Term of College		
Number of Students	:	8
Mean = 10.96, SD = 3.31, Range = 4-14		
Major Area of Concentration in College		
Business	:	7
Other	:	1

Despite the obstacles, more than 85% of those students surveyed said they intended to focus their studies in college on business related courses. Seven of the 17 students queried had already begun by completing courses in accounting and data processing during their freshman year. Most, if not all, of the students who studied these areas during their freshman year said they had felt that they were well prepared and very familiar with the material because of the prior exposure. According to the students, the major difference between their experience in the articulation course at the high school and community college levels was in the rate of instruction. According to all respondents the pace of instruction at the community college was faster, as could be expected. The content of instruction at both institutions was seen to be identical.

The attitude of the students toward the articulation experience was understandably mixed. The majority indicated articulation courses were more useful than some of the other courses available to high school seniors. In that sense the respondents felt positively about articulation. But 6 of the 17 students questioned came away from the

experience with negative feelings. When asked to elaborate, the students spoke of the perceived inadequacy of the teacher, the lack of computer related facilities, and a general sense of disappointment (after all, they were promised college credit in addition to credit toward their high school diploma).

When asked if they would recommend this type of articulation course to friends or classmates, the response was overwhelmingly affirmative. Again, the students stressed the usefulness and practicality of studying accounting and/or data processing in high school. They felt that articulation efforts at the high school/college level should indeed be continued.

Summary

In general, it would be fair to summarize the results of this telephone follow up survey of students participating in the initial phase of the articulation project as indicating generally favorable attitudes towards the articulation project. Students, obviously, expressed considerable negative feelings about the failure to grant college credit for the articulation course taken at the high school level. Clearly, this part of the experience had considerable negative affect attached to it. Queensborough Community College was unable to grant college credit since students did not take the previously agreed upon examination to determine minimal competency in the data processing and accounting areas. It will be recalled that the examination could not be administered due to the totally unanticipated shutdown of the City University for two weeks at the height of the New York City financial crisis in the Spring of 1976. The failure to grant credit then, could not be blamed on any of the participating institutions, and is also, one would hope, unlikely to reoccur.

The results of the telephone survey suggests that were college credit granted, the attitude of students would have been even more positive than indicated on the other questions, and few negative feelings about the program would remain.

One other source of criticism deserves mention. The students appeared to feel that more "hands-on" experience in the data processing course would have been desirable. This student comment is in accord with much professional feeling in the data processing area that there is little substitute for such experience with data processing equipment. It may be advisable in future articulation efforts to assure that schools implementing a data processing curriculum have access to the equipment on which students can get actual laboratory experience.

With the exception of the two areas of negative comment noted above it is safe to summarize the balance of the student opinion towards articulation as ranging from positive to enthusiastic. Students clearly felt that they had participated in a worthwhile experience, overwhelmingly noted that they would recommend it, and commented favorably on the practicality and usefulness of the courses. While the absence of achievement data lead to some caution about these conclusions, the attitudinal data argue strongly in favor of implementing the articulation activities, and suggest that it may be very worthwhile to explore the pursuit of similar articulation efforts in other areas.

DESCRIPTION OF PHASE II

Phase II of this articulation project was conducted during the 1976-1977 academic year. The curricula developed as a result of this project were implemented at three feeder high schools to Queensborough Community College. The accounting curriculum was implemented at Benjamin Cardozo and at Bayside High Schools, and the data processing curriculum was offered at John Bowne High School.

It may be helpful at this stage to review the major objectives of this curriculum.

Accounting Curriculum Objectives

The course in accounting is divided into 12 sections. The topics included are:

(1) Basis for Business Decisions
(2) Recording Changes
(3) Measuring Business Income
(4) Adjustments
(5) Transactions Involving Merchandise
(6) Control Procedures
(7) Special Journals
(8) Control of Cash
(9) Receivables and Payables
(10) Depreciation of Plant and Equipment
(11) Disposal of Plant Assets
(12) Payroll

Each section or topic is divided into small areas of study. The day on which each area is to be studied and the required textbook chapter for each area is indicated in the course outline.

Two short summary paragraphs appear before the outline to each main section. The first paragraph explains the unit and its importance. The second paragraph describes the skills which the student is expected to possess upon completion of the section.

Evaluation of Accounting Curriculum

A total of 53 students participated in the accounting curriculum. Of these, 31 were at Benjamin Cardozo and 22 at Bayside High School. It had previously been agreed that the faculty of the Business Department at Queensborough Community College would design and administer a final examination to the students participating in the articulatory activity in order to ascertain whether college credit could be granted to students. The Business faculty at Queensborough Community College had decided to use a score of 70% as the index of minimal mastery. This cut-off score was identical to that employed by the Department for purposes of evaluating students who claimed to have relevant business or other experiences and, on the basis of these, applied for exemption from the introductory accounting course. Students obtaining scores below 70 would be required to take the course again at the community college.

Evaluation Procedures

The accounting final examination was administered by the faculty of Queensborough Community College to students at Benjamin Cardozo and Bayside High School on June 14, 1977. The examination contained a total of 13 questions posing routine accounting problems to be solved by students.

A complete copy of that exam is appended to this report, as Appendix C. All of the students, save for one who was absent on that day, who had attended the course during the year were present for the final examination. Complete rosters of the students in each of the high schools, and the scores attained on this examination are appended to this report as Appendix C.

Table 4

Descriptive Statistics for Achievement Data of Accounting Students

	Cardozo High School	Bayside High School	Total
Number of Students	31	22	53
Mean	50.03	67.95	57.47
Standard Deviation	19.87	10.98	18.95
Median	48	67	59
Range	97-16	96-53	97-16
Number Scoring Above 70	3	8	11
% Scoring Above 70	10%	36%	21%

Evaluation Results

Table 4 appearing above, gives the means, standard deviations, medians, and range of scores and number of students scoring above the criterion at Benjamin Cardozo and Bayside High Schools. The achievement data for both schools, and especially for that of Cardozo High School were somewhat disappointing. At Cardozo only 10% of the students who were taking the curriculum obtained a score of 70, and at Bayside High School the percentage was 36%. For the two schools

combined a total of 21% of the students obtained the index of minimal mastery which would enable them to receive credit for the year's work at the community college.

As indicated previously, in the review of the literature section, data regarding how the achievement of students in the present sample compare to other students participating in articulatory experiments are not readily available.

One statistic which may be useful in assessing the achievement of these articulation students is the percentage of students who typically pass exemption examinations at Queensborough Community College. The standard exemption exam used by the Business Department is very similar to the test given to the present sample. According to the Chairman of the Business Department at Queensborough less than 10% of the students taking the exemption examination obtain a score high enough to exempt them from the course. By this standard the mean passing ratio of 21% for both schools combined is satisfactory, if not outstanding.

On an absolute standard, however, overall achievement is somewhat disappointing. After students have spent an entire academic year studying a curriculum, one would expect somewhat more than 20% of them to obtain scores of 70% and above. The reasons for this relatively low achievement may rest either in individual differences among the students, or, perhaps in difficulties in the way the curriculum was implemented, or in some combination of these. The results provide some guidance regarding this matter. The fact that there was a considerable achievement differences of approximately 18 raw score points in achievement between the schools is suggestive. The significance of this difference was determined by computing a t test of the difference between the means. The t of 3.49 was significant beyond the .01 level indicating that the achievement differences between the schools were unlikely to have occurred by chance.

If we are to assume that the two schools have approximately comparable student bodies, it suggests that there may well have been substantial differences in the effectiveness with which the curricula were implemented. Since these two high schools draw from roughly

comparable populations, one would suspect that the difference in achievement between the two schools may well have been attributable to instructional differences, at least in part. It must be pointed out, however, that differences between the abilities of the students cannot be ruled out on the basis of the available data.

There is a suggestion in the data, then, that the achievement difference between the two schools may be partially attributable to differences in the effectiveness which the curricula were implemented. If this is the case, one could then suspect that assistance with the implementation of the project might result in a higher incidence of success on the curriculum.

Summary

The results of the criterion test for the accounting curriculum indicated that the overall average score was 57%.

For both schools combined a total of 11 students, or 21% of those participating, achieved a score high enough to obtain college ctedit for the articulation course taken in high school. While these results compare favorably to the average of less than 10% who pass similar exemption examinations administered by the Department of Business the scores are disappointing on an absolute scale. There are suggestions in the data that differences in the effectiveness with which the curriculum was implemented may partially account for this problem.

DATA PROCESSING CURRICULUM

The curriculum in Data Processing was implemented at John Bowne High School, another feeder high school to Queensborough Community College. A review of the objectives of this curriculum may be helpful at this point.

Curriculum in Data Processing (COBOL) Objectives

The following are the stated objectives of the course:

(1) To develop an understanding of concepts and operational principles inherent in data processing systems.

(2) To introduce the student to programming various computers, in a problem-oriented language.

(3) To give the student "hands-on" experience in running and setting up of programs that can update files, sequence to check records.

(4) To prepare the student for taking college examinations for advanced placement toward a degree in data processing.

The course was divided into two terms, each term being 20 weeks long. The course outline specifies the weeks during which each topic will be covered. One exam is given at the end of each term.

Among the reference materials required are notes prepared by two professors. These notes include charts and illustrations.

Evaluation Procedure at John Bowne High School

There were a total of 26 students enrolled in the data processing curriculum at this high school. The examination developed by the Queensborough Community College business faculty for this course contained two parts: Part I was of a general theoretical nature and consisted of true/false, and multiple choice questions and Part II consisted of problem solving questions. Part I of this examination is reproduced in Appendix E.

It had been explained to the students enrolled in the data processing curriculum that both parts of the examination were required in order for them to receive credit at Queensborough Community College. Part I of the examination was administered during a regular classroom period. Part II required the students to return in the afternoon for a full afternoon examination. This part of the examination apparently conflicted with Regent's preparation and similar activities in the high school. Most of the classes taking the exam indicated that relatively few students were interested in receiving advanced standing at Queensborough Community College. The issue was put to a student vote, and the results of that vote indicated that the class preferred to do without Part II of that examination. Consequently, in all of the discussions of the evaluation at John Bowne, results apply only to the first part of the exam.

Results of Data Processing Evaluation

Table 5 presents the final results of the achievement tests for the data processing curriculum. The classroom average of 37.7 is based on a total of 50 items, giving an average percentage achievement of 75%. The range of scores, in percentage was, from a low of 46% to a high of 98%.

It should be noted that these data cannot be directly compared to those for the accounting curriculum for a number of reasons. First of all, it is impossible to ascertain whether the examinations were of equal difficulty. Second, it should be remembered that only part one of a two part examination was administered. It may well have been that the students overall achievement would have been reduced if part two had been administered as well.

Table 5

Descriptive Statistics for Achievement Tests of Data Processing Students

Number of Students	24
Mean	37.7
Standard Deviation	7.9
Median	38.5
Range	48-23

Despite these considerations, it is encouraging to note that in the data processing curriculum the achievement is considerably above that for the accounting curriculum, and similar to that to be expected in a community college examination. While, as indicated above, this could be attributed to a variety of factors, it does suggest that there is no reason why achievement on articulation courses should be much below that generally experienced in high school or community college.

There is further reason for satisfaction with the results from the data processing curriculum. Part I of this curriculum was similar to that usually administered to students completing the comparable data processing course at Queensborough Community College. Consultation with Department of Business faculty at Queensborough has indicated that the mean performance of approximately 75% on that part of the test was comparable and perhaps even slightly superior to that obtained by students completing the data processing course at the community college. Such results are, of course, extremely encouraging since they indicate that with the respect to the basic understanding of principles of data processing the articulation course taken in high school resulted in outcomes at least as successful as these students may have obtained had they taken the course at the community college level. As indicated above, these results must be considered tentative, since students did not take the complete examination required. With these limitations in mind, the results from John Bowne High School strongly endorse the concept of articulation, and indicate that as far as the understanding of the basic concepts of data processing is concerned the program achieved its objectives.

INSTITUTIONALIZING ARTICULATION PROCEDURES

There are generally many criteria by which the success of a particular project may be measured. Achievement outcomes, of course, are one such important criterion, attitudinal outcomes are another. Both of these have been referred to previously in this report. For a project such as articulation however, which involved establishing relationships between different institutions with the intent that these relationships continue when the project support is gradually withdrawn a third outcome is important. That is, that the relationships and mechanisms established as a result of the project continue to function after its termination. Such an outcome is of even greater importance than achievement and attitude, since it indicates that the project goals have met the empirical test of continued use. Such institutionalized continuation of articulation procedures would

indicate that the students, and faculties involved have found it a useful and viable avenue in the attainment of their educational goals.

It is especially gratifying to note that there are indications to suggest that the present articulation project has in fact become institutionalized in this manner. One of these indications rests in the fact that the principal of Forest Hills High School, another feeder high school for Queensborough Community College, has indicated his desire to implement articulation courses at that school. Such an independent development free from stimulation by project personnel, is an encouraging indication that the articulation practices originated in this project have a good possibility of becoming institutionalized. Further evidence to this end is the fact that arrangements are presently proceeding for the continued implementation of the accounting and data processing curricula. The three high schools presently involved are, Benjamin Cardozo High School, Bayside High School, and John Bowne High School. The readiness of the present schools, and that of new school to implement articulation procedures underlines the fact that both among faculty bodies, and among students there is a reservoir of positive attitudes towards articulation practices. It is hoped that these accomplishments can be consolidated in the next period.

GENERAL SUMMARY

This overall summary of the articulation project is based on both the results of Phase I and Phase II of the project. It will be recalled in Phase I, due to circumstances beyond anyone's control the final achievement evaluation of students participating in the articulation project in the 1975-1976 academic year could not occur due to the unexpected shutdown of the City University. Consequently, a telephone follow up survey of these students had to be conducted. Achievement was evaluated in Phase II. Finally, evaluative information was obtained from both community college faculty, and personnel rom the Board of Education directly involved in these articulation efforts.

With respect to student's attitude toward the articulation efforts, these were in general highly favorable to the concept of articulation. That is, in both Phase I and Phase II students expressed themselves very favorably towards the idea of taking courses as seniors in high school for which advanced credit in post secondary education would be given. Furthermore, it would be fair to summarize that students had very positive attitudes towards the course content. Typical comments alluded favorably to the practical nature of the course content to the usefullness of the course material with respect to students' day to day lives, its appropriateness to their long range vocational objectives, and the material they expected to study in postsecondary education. In almost all instances, students indicated that they would recommend that other students avail themselves of the opportunity to participate in similar articulation courses.

There were also some negative feelings expressed regarding the articulation experience. Especially with the respect to Phase I negative attitudes were expressed by students regarding the failure to receive college credit for the articulation courses. From the students point of view this is obviously understandable, and from the institutions' point of view, of course, the fact that the City University was unexpectedly closed prevented the college from administering the appropriate evaluations on the basis of which advanced credit could be offered. It would appear that this was a dilemma attributable to unforeseen circumstances which are most unlikely to recur. Since, then, this is a onetime occurrance these negative comments cannot be held to apply to the articulation experience in general, but rather to this onetime occurrance.

In the first phase students also expressed some negative feeling towards the way some of the courses were implemented. In part this reaction appeared to be attributable to individuals, and in part, a reflection of the student feeling, that there was not enough equipment available to provide them with sufficient "hands-on" experiance with data processing equipment.

A major recommendation emerging from the experience with this articulation project would be that greater care be exercised in the

implementation of the instructional material at the high school level. It appears quite clear that strong positive feelings, with the exceptions noted above, towards the articulation experience were expressed by students and faculty. This indicated that students are not only likely to be willing to participate in such an experience in the future, but actually go out of their way to seek it out when offered. Such positive motivation should, one would believe, lead to a relatively successful experience.

If some of the achievement results from the accounting course were less satisfactory than had been expected, this would suggest that greater assistance in the way the instructional materials are implemented may well be very desirable. Clearly, if students see the experience as desirable and worthwhile, and express continued eagerness to profit from similar experiences the implementation of articulation courses could be improved so that students' achievement could be at the same high level as their attitudes. The fact that students exposed to the data processing course achieved at least as well as students studying this material at the community college level reemphasizes the fact that unsatisfactory achievement is unlikely to be related to the possibility that high school students have difficulty mastering this type of content. Instead the suggestion emerging from this project is that there is considerable variability in the way articulation has been complemented, and that greater support should be given with its implementation.

Finally, the indications that articulation experiences are becomming institutionalized as seen by the readiness of another high school to participate in articulation courses, and the continued readiness of the present schools to carry on the articulation courses, strongly suggests that from the point of view of the institutions involved the articulation program has accomplished the objectives set for it.

Recommendations

A major recommendation emerging from the results of this follow up investigation, then, would be to extend the project in the following

manner: In further implementation of articulation, support should be given to the personnel at the high school level in the implementation of the course materials. This assistance could be in some of the following areas:

(1) Collegial assistance by the postsecondary faculty with suggestions regarding modifications in the manner in which the material is presented to students. Such assistance could be in the form of establishing an instructional assistance team composed of both subject matter experts, and experts in the human learning and instruction area. Through a series of training experiences including workshops, and field visits, the implementation of such courses could be significantly improved, and the articulation experience even more successful than at present.

(2) Providing more "hands on" experience in the data processing course. Student attitudes responses suggested that there was insufficient practical experience with data processing equipment. Perhaps more such experience could be provided on equipment in school or, if unavailable, by field visits to facilities in the community who would make such equipment available for use.

(3) Continue consultation between community college and high school personnel to improve, refine, and extend articulation practices.

APPENDIX

Appendix A

Roster of Students Participating in Phase I

ACCOUNTING ARTICULATION PROGRAM

Name of Students	First Choice	Second Choice	Third Choice
Bayside High School			
Ippolito, Robert	Queens	Queensboro	
Loguerico, Nicholas	Baruch	Queens	Queensboro
Moeller, Eric	Queens	Queensboro	
Voigt, Richard	Queens	City College	Queensboro
Benjamin Cardoza H. S.			
Berkowitz, Steven	Queensboro		
Allen, David	Queensboro		
Bauman, Barry	Queens	Queensboro	
Miller, Steven	Queens	Queensboro	
Chimkin, Gary	Queens	Queensboro	
Follo, Robert	Queens	Queensboro	
Carbone, Vincent	Queens	Queensboro	
Marin, Joft	Queens	Queensboro	
Zarkin, Leslie	Queens	Queensboro	
Rosenberg, Wendy	Queens	Queensboro	
Askins, Philip	Queens	Queensboro	
Lombard, Kenneth	Baruch	Queensboro	

DATA PROCESSING ARTICULATION PROGRAM

John Bowne High School			
Buda, Ian	Queens	Jay	Queensboro
Fuchino, Tina	Queensboro		
Goldsmith, Janet	Queens	Queensboro	
Lane, Mariana	Queensboro		
Silverstein, Jay	Queens	Queensboro	
Walpin, Martin	Baruch	Queensboro	
Szabol, Kathy	Queensboro		
Pagoulatis, Lucas	Baruch	La Guardia	Queensboro
Mangwina, Asher	Baruch	Queens	Queensboro
Nunez, Carl	Queensboro		
Belluski, Marc	Baruch	Queensboro	
Ferra, Luis	Queensboro		

Appendix B1

Telephone Follow Up

HIGH SCHOOL ARTICULATION QUESTIONNAIRE

Name: _____ Date: _____

1. Are you attending College now? Yes _____ No _____

   If yes, name of college. _____

   If no, are you employed? Yes _____ No _____

   If yes, occupation. _____

2. What colleges did you apply for admission to?

   A.) _____ C.) _____

   B.) _____ D.) _____

3. Which colleges accepted your admission's application?

   A.) _____ C.) _____

   B.) _____ D.) _____

4. Did the imposition of tuition at CUNY affect your choice of college? Yes _____ No _____

   If yes, in what way?

5. What is your area of concentration (major) at the college?

6. What are your general feelings concerning the articulation course you took in high school?

7. Why do you feel that way?

8. How many college credits have you completed?

9. Have you studied _____ on a college level? Yes_____ No_____

   If no, do you plan to study it in the near future? Yes_____ No_____

   If yes, did you feel the _____ articulation course adequately prepared you for the college course? Yes_____ No_____

10. How similar or different was the high school course as compared to the college course?

11. Was there duplication of content in the college course? Yes_____ No_____

12. Do you feel you should have given advanced standing in _____ by college upon entrance? Yes_____ No_____

13. Do you have any suggestions or advice that you would like to pass on to other students taking similar articulation courses?

Appendix C1

Accounting Final Examination

QUEENSBOROUGH COMMUNITY COLLEGE
The City University of New York

ACCOUNTING PRINCIPLES (PART I)

Name_____ School_____

All entries are to be done in general journal form.

Explanations for entries are to be omitted throughout this examination.

I. A machine was purchased on January 3, 1971 for $24,000. The machine had an estimated useful life of five years or 10,000 hours of operation and an estimated salvage value of $3,000. Depreciation expense in 19Y1 (first year) would be:

a. Using the straight-line method.....$_____

b. Using the sum-of-the-years' digits method..... _____

c. Using the fixed-percentage-on-declining-balance method (double the straight-line rate) _____

d. Using the units-of-output method (assuming the machine was run 3,000 hours during 19Y1).. _____

Computations:

II. A schedule of accounts receivable on October 1, 19Y1 is shown below:

Serv U. Rite	$ 1,300	
R. M. Nixon	900	
Tom Righton	1,200	$ 3,400

The sales journal for the first week of October includes the following sales on account:

R. M. Nixon	$ 300	
Weighout Inn	650	
Tom Righton	200	
Wedo Well	800	$ 1,950

The cash receipts journal shows that Serv U. Rite paid $300 on account on October 2, and Tom Righton paid $1,200 on account on October 3.

In the space below, prepare a schedule of accounts receivable as of October 7, 19Y1.

Customers	Amount Receivable
	$
Totals	$

Computations:

III. For the payroll period ended January 15, the office employees of the Real World Company had gross earnings of $12,000. Income tax withholding amounted to $1750. The FICA tax rate is 5% on a $9000 base. The payroll is also subject to a state unemployment tax of 2.7% and federal unemployment tax of .8% on a $3000 base. None of the employees earned more than $3000 during this first pay period of the year.

Prepare in general journal form (omitting any explanation)

a. An entry to record the total payroll, the deductions from employees' pay

b. An entry to accrue payroll taxes of the employer

(a)				
(b)				

Computations: (Here and on back of this page)

IV. A business enterprise paid a premium of $2,628 for a three year property insurance policy effective July 1, 19Y1

Determine the following amounts for the enterprise, assuming that the fiscal year ends on September 30:

a) Amount of premium expired during the year ended September 30, 19Y1

Computation

$_____

b) Amount of unexpired premium at September 30, 19Y1

Computation

$_____

c) Amount of premium expired for the year ended September 30, 19Y2

Computation

$_____

d) Amount of unexpired premium at September 30, 19Y2

Computation

$_____

5

V. On February 1, a petty cash fund was established with $175.

On February 29, the petty fund cashier had $25.85 in change and the following receipts:

Store Supplies	$ 48.00
Office Supplies	37.52
Miscellaneous Selling Expense	33.70
Miscellaneous General Expense	30.13

Present Entry on February 29th to record voucher for the replenishment of Petty Cash Fund.

Computations:

VI. A tractor was purchased two years ago at a cost of $6,000. It had an estimated life of 5 years and an estimated residual value of $1,000. Depreciation was recorded at the end of the first and second year, under the straight-line method of depreciation.

Present below the entry for each different situation required when at the end of the second year if:

a) The tractor is traded in for another tractor with a list price of $7,000. Trade-in allowance is $4,500, balance cash.

Loss or gain is to be recorded

(a)				

Computation:

b) The tractor was sold for $3,500 cash

(b)				

Computation:

VII. Prepare the bank reconciliation of the Queensborough Company on the basis of following data for April 30.

(a) A check to Miss Rosalie for $294 in payment of a voucher had been recorded in the check register as $249.

(b) Bank credit memorandum for note collected by bank, $2,525 including $25 interest.

(c) Bank debit memorandum for service charges, $5.

(d) Check outstanding: $1,500.

(e) Deposit in transit not recorded by bank, $650.

(f) The bank statement indicated a balance of $10,050. on April 30.

(g) The Cash In Bank account balance is $6,725.

UNDER THE ALLOWANCE METHOD FOR ACCOUNTING FOR UNCOLLECTIBLES THE FOLLOWING QUESTIONS ARE NOT DEPENDENT ON EACH OTHER.

VIII. On the books of the Lizard Company, R. U. Sure, a customer who originally owed $3,000 and whose balance was written off as uncollectible March 3, sends a check on September 28 for $2,100.

Give the journal entry or entries, for September 28.

IX. On the books of the Rattle L. Snake Company an amount of $2,500 is due from the Shirley Co. This amount is written off because the customer has no assets.

Give the journal entry.

X. The trial balance of the Brandy Company includes the following normal account balances on December 31.

Accounts Receivable	$ 35,000
Allowance for Doubtful Accounts	1,800

Record adjusting entry on the basis of an alalysis of the accounts receivable it is estimated that $2,364 will be uncollectible.

Certain data are given on the work sheet below and certain missing data are indicated by the blank boxes. Sufficient information is included to fill in the missing data. Each account has a debit or credit characteristic normal for that kind of account. Note that the dollar amounts have been reduced to figures of not more than two integers, to simplify the arithmetic.

Instructions:
Insert the figures necessary to complete the work sheet in the blanks indicated by each boxed area. The boxes cover both debit and credit columns; be sure to insert the missing figures in the correct column of the box.

	Trial Balance		Adjustments		Income Statement		Balance Sheet	
	Dr	Cr	Dr	Cr	Dr	Cr	Dr	Cr
Cash (example).....	9						9	
Fees receivable.....	14		5					
Supplies on hand.....				1			2	
Equipment.....	16						16	
Accumulated depreciation.....		4						
Unearned fees.....			4					1
Accounts payable.....		15						15
Wages payable.....								3
G. Ford, Capital.....		24						
G. Ford, Drawing.....	1							
Fees earned.....		7						
Advertising expense.....	7				7			
Wage expense.....			3		8			
Supplies used.....					1			
Depreciation expense.....					2			
Totals.....	55	55						
Net (?)_____								
Totals.....					18	18	49	49

XII The bank statement and other records of the Marcia Company show the following information:

The collection by the bank of a $800 note receivable at maturity plus interest at 6% for 45 days. This transaction has not been recorded on the books of the Marcia Company.

What entry is required on the books?

Computation:

XIII. The weekly payroll of the Dani Company is $1,500, paid on Friday. If the fiscal year ends on September 30, and the last Friday in September was September 26, (the firm is closed on Saturdays and Sundays), what is the adjusting entry to be made, on September 30?

Computation:

Appendix D1

Roster of Students Participating in Phase II-Accounting

Bayside HS BUll June 14, 1977

Name	Grade
[redacted] Glenn	67
[redacted], Cindy	75
[redacted] Evan	58
[redacted] Gegory	74
[redacted], Andrea	56
[redacted], Susanne	61
[redacted], Cathy	70
[redacted] Rosemarie	68
[redacted], Carol	77
[redacted], Abbe	64
[redacted] Phillip	96
[redacted] Guy	60
[redacted], Christine	65
[redacted] Linda	56
[redacted] Brian	93
[redacted] Cindy	77
[redacted] Doug	68
[redacted] Liz	73
[redacted] Jeff	67
[redacted] Cindy	53
[redacted] Bart	62
[redacted] Henry	55

CARDOZA BU 11 June 14, 1977

Name	Grade
[redacted] Jay	42
[redacted]m, Helen	59
[redacted]n, Gerald	57
[redacted], Bradley	16
[redacted] Michael	20
[redacted], Bonnie	60
[redacted], Stacey	37
[redacted] Robert	59
[redacted], Debbie	34
[redacted] William	69
[redacted], Earla	52
[redacted] Gina	64
[redacted], Julio	38
[redacted] Leslie	63
[redacted] Howard	89
[redacted] Greg	76
[redacted]r, Mark	42
[redacted], Brian	18
[redacted] Marlene	44
[redacted] Scott	29
[redacted] [illegible]ki	59
[redacted] Rochelle	40
[redacted], Lillian	21
[redacted] Mark	32
[redacted], Lori	83
[redacted], Blair	50
[redacted], Mark	44
[redacted], Nanette	54
[redacted] Carol	46
[redacted] Fran	57
[redacted], Paul	97

Appendix E1

Part I of Data Processing Exam

QUEENSBOROUGH COMMUNITY COLLEGE
The City University of New York

_____
(School)

_____
(Student's Name)

BU 51 exam

June 1977

ANSWER THE FOLLOWING QUESTIONS ON THE SPECIAL MARK-SENSE ANSWER SHEETS PROVIDED FOR THIS PURPOSE. USE ONLY A NUMBER TWO PENCIL, AS NO OTHER ONE WILL WORK CORRECTLY.

PART 1. TRUE OR FALSE QUESTIONS (35 points)

1._____In addition to the division name, the only other statement required in the IDENTIFICATION DIVISION, is AUTHOR.

2._____The REMARKS statement is not compiled as part of the object program, but serves as documentation only.

3._____All Division, and Paragraph names, must start in Margin A. There are no exceptions to this rule.

4._____Non-numeric literals can contain a maximum of 120 characters, and must be enclosed with quote marks.

5._____Data names can be a maximum of 32 characters, and must not contain embedded blanks.

6._____The REDEFINES clause specifies that the same area provides an alternative grouping or description of data.

7._____The main function of the COBOL compiler, is to translate the Source Program into an Object Program.

8._____In COBOL, we always READ (using the file name) and WRITE (using the record name).

9._____The DATA DIVISION of a COBOL program describes the files to be processed by the object program.

10._____The function of the SELECT statement is to associate a file name with a physical input/output device.

11._____The entry PICTURE A(25) may be used to describe a field containing numbers. letters of the alphabet, or blanks.

12._____The PROCEDURE DIVISION is the only required division in a COBOL program, as it is this division that generates the machine language instructions.

13._____The statement: DIVIDE MONTHS BY YEARS GIVING AVERAGE is a valid COBOL statement.

14._____Using ANSI COBOL standards, the following statement is correct:
ADD XYZ TO ABC GIVING RESULT.

15._____GO TO XYZ-ROUTINE, is an example of an unconditional branch instruction.

16._____SUBTRACT COST FROM SALES GIVING PROFIT is a correct COBOL statement.

17._____The decimal point in an edited output field to be printed, is specified by the use of the "V" character.

18._____MULTIPLY RATE-CD BY HOURS-CD GIVING TOTAL PAY ROUNDED is a correct COBOL statement.

19._____The following set of statements are correct:

```
003150     DIVIDE MONTHS INTO Y-T-D SALES GIVING AVERAGE SALES
003160          ROUNDED ON SIZE ERROR MOVE '***MONTHS EMPLOYED
003170-         'ZERO-NO CALCULATION PERFORMED***' TO MSG.
```

In the above statements the word DIVIDE begins in margin B. In statement 003160, the word EMPLOYED ends in column 72 of your coding sheet, and in statement 003170, the dash immediately following the page and line number is in column 7 of the coding sheet.

20._____In using the VALUE clause, the programmer may use the following words: ZERO, ZEROES, SPACE, or SPACES. These are the only entries permitted with the value clause.

21._____The statement USAGE IS COMP-3, specifies that the item is stored in the external decimal format.

22._____The statement: IF YEARTODATE IS GREATER THAN 7800 NEXT SENTENCE ELSE GO TO FICA-ROUTINE is a correct COBOL statement.

23._____Three types of test conditions, normally associated with the IF statement are the Relation, Sign, and Class tests.

24._____IF FLDA IS ALPHABETIC GO TO PRINT-ROUTINE. The branch to PRINT-ROUTINE, will take place if part of FLDA is numeric.

25._____WRITE PRINT-REC FROM TOTAL-LINE AFTER ADVANCING 3 LINES. The above statement will first skip 3 lines, then print a line, using the contents of the work area known as TOTAL-LINE.

26._____The REDEFINES clause can only regroup a 9's field to an X defined field. It cannot, however, work in reverse.

27._____WRITE PRINT-REC BEFORE ADVANCING 2 LINES is a correct COBOL statement.

28._____A function of the PERFORM statement is to permit the same set of instructions (i.e. a routine) to be used from several locations in the program.

29._____Records may only be described in the FILE SECTION.

30._____The NOTE statement permits the programmer to write explanatory comments in the PROCEDURE DIVISION of a source program.

31._____The OCCURS clause is used in defining related sets of repeated data, such as tables, lists, etc. The programmer must always reference the items described by the OCCURS clause using subscripts.

32._____The SORT verb permits the programmer to easily access the SORT program which is part of the OPERATING SYSTEM.

33._____If a VALUE clause is not specified for a data item in the WORKING-STORAGE SECTION, the data item will be filled with blanks if it is an alphanumeric item and with zeros if it is a numeric item.

34._____EXAMINE ITEM-1 REPLACING LEADING '*' BY SPACE. This statement is incorrect because special characters such as the asterisk (*) cannot be used with the EXAMINE statement.

35._____The statement: 77 COUNTER PIC 99 VALUE SPACES is a correct COBOL statement.

PART II. MULTIPLE CHOICE QUESTIONS (15 points)

36._____The PROGRAM-ID name must be composed with the following rule(s):

a. a maximum of 8 characters
b. must begin with an asterisk (*).
c. There must be no imbedded dashes or blanks in the name.
d. a and c above.
e. none of the above.

37.____When closing both a card and a print file, at the end of a COBOL program, the following statements could possible be used:

1. CLOSE INPUT CARD-FILE.
2. CLOSE PRINT-FILE.

a. Statement 1 is correct, 2 is incorrect.
b. Statement 2 is correct, 1 is incorrect.
c. They are both incorrect.
d. They are both correct.
e. none of the above.

38.____SUBTRACT 5.00 FROM ACCOUNT-IN GIVING NEW-BALANCE.

a. is a correct example of a numeric literal being used in a subtract statement.
b. is incorrect.
c. must be modified with a $ sign in front of the 5.00.
d. must contain both the dollar sign and a + or - sign after the 5.00.
e. none of the above.

39.____Given the following data is stored in the computer memory - the number 12345. The edited picture: PICTURE $$$$99. The printed output would be:

a. $**123.45
b. $12345
c. ****12345
d. $$$$45
e. none of the above

40.____In setting up a print line, we usually allow one extra print position at the beginning of the print line so:

a. that in creating a magnetic report tape, there is proper carriage control and line skipping.
b. that the printer is faster.
c. we can print an extra long print line.
d. a and b.
e. none of the above

41.____The statement: MOVE SPACES TO PRINTLINE will:

a. move zeros to the first significant space, called PRINTLINE.
b. will prevent alphabetic characters from printing in the area called PRINTLINE.
c. will blank-out or move blanks into PRINTLINE.
d. none of the above
e. a and b

42.____To set up a reserved decimal point, in the following input data: 1,123,968.23 the input field must be described in the following way:
   a. Z,ZZZ,ZZZ.99
   b. PICTURE 9,999,999.99
   c. PICTURE 9999999V99
   d. PICTURE 99999V9999
   e. none of the above

43.____USAGE IS COMPUTATIONAL-3, or USAGE IS COMP-3 are:
   a. both used to display an item on the console printer.
   b. used to store data in the BINARY format.
   c. used to store data in the packed decimal format.
   d. b and c above
   e. none of the above

44.____In the following statement, NAME1, and NAME2, are both employee names.

IF NAME1 IS EQUAL TO NAME2 GO TO LIST-REPORT.

   a. the above statement compares two non-numeric items, if they are equal a conditional branch then takes place to LIST-REPORT.
   b. the above statement compares two numeric literals.
   c. the IF STATEMENT can only be used with numeric report items.
   d. the statement is incorrect as is.
   e. none of the above

45.____In a carriage control tape for a printer, a punch in CHANNEL 1, indicates where the first line of print is to appear in the report. A punch in Channel 12:
   a. indicates where the middle of the report is:
   b. indicates where the end of the report is, and therefore, will stop the computer automatically.
   c. indicates where the last line of printing will occur in this report.
   d. b and c
   e. none of the above

46.____When the paragraph containing the word EXIT is not used, control is returned after a PERFORM statement, when:
   a. a new paragraph name is encountered.
   b. when the RETURN-ROUTINE paragraph is encountered.
   c. when the CPU clock specially designed for this purpose is reset.
   d. a and b above
   e. none of the above

47.____The statement:

030-EXIT. EXIT.

a. 030-EXIT., is a paragraph name, and this statement is correc'.
b. the name of the paragraph could not have the word EXIT in it, and is therefore incorrect.
c. the only entry that this paragraph can contain is the word EXIT.
d. a and c above
e. none of the above

48.____To refer to an individual item in a table, the data-name must be ____? a subscript.

a. selected by
b. preceded by
c. followed by
d. ignored by

49.____The PERFORM verb has many advantages. The best advantage is that

a. it allows you to set up subroutines.
b. a frequently used routine need be coded only once and can be accessed from many locations within the program.
c. it allows you to control with a minimum of writing.
d. you cannot achieve these same functions with program switches.
e. it is a conditional branch similar to GO TO branch.

50.____GO TO A,B,C DEPENDING ON FIELD. Field must be

a. an elementary numeric item.
b. a group numeric item.
c. an elementary alphanumeric item.
d. a group alphanumeric item.
e. none of the above

Appendix F

Roster of Students Participating in Phase II-Data Processing

JOHN BOWNE HIGH SCHOOL

Board of Education - City of New York

63-25 Main Street Flushing, New York 11367 212-263-1919

Bernard Ludwig
Principal

June 29, 1977

1st YEAR ARTICULATED DATA PROCESSING COURSE - FINAL EXAMINATION PART I (only)
Correct out of 50

[redacted], Joseph	27
[redacted], William	48
[redacted], Karen	26
[redacted], Lisa	39
[redacted], Luis	37
[redacted], Christine	48
[redacted], Ben	27
[redacted], Bob	40
[redacted], Joe	38
[redacted], Daniel	48
[redacted], Steven	44
[redacted], Karen	42
[redacted], John	23
[redacted], Joyce	39
[redacted], Mercedes	35
[redacted], Debbie	25
[redacted], Billy	33
[redacted], Beth	38
[redacted], Richard	48
[redacted], Cara	47
[redacted], Inarra	abs.
[redacted], Steven	35
[redacted], Todd	abs.
[redacted], Darlene	39
[redacted], Ruby	31
[redacted], Felix	48